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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

LU, FRANK WEI MIN

ART UNIT	PAPER NUMBER
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1634

DATE MAILED: 10/03/2002

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Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/853,806

Applicant(s)

BLUMENDFELD ET AL.,

Examiner

Frank W Lu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 11 May 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 23-32 and 73-77 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 23-32 and 73-77 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.5.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

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**DETAILED ACTION**

***Preliminary Amendment***

1. Preliminary amendment filed on May 11, 2001 has been entered in Paper No. 4. Claims 1-22 and 33-72 has been canceled. Pending claims are claims 23-32 and 73-77.

***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:  
  
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
3. Claims 23-32 and 73-77 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
4. Claim 23 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps since there is no correlation between the method step of the goal of the method that generates a temperature gradient. See MPEP § 2172.01. The omitted steps are: how to generate a temperature gradient.
5. Claim 24 is rejected as vague and indefinite because it is unclear what it intended. If the temperature sensor in claim 24 is the electrical connector, claim 24 will only have one electrical connector instead of two electrical connectors as recited in claim 23. Please clarify.
6. The term “low thermal conductivity” in claims 31 and 73 is a relative term which renders the claim indefinite. The term “low thermal conductivity” is not defined by the claim,

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the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

***Claim Rejections - 35 USC § 102***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

8. Claims 23-25 and 29-33 are rejected under 35 U.S.C. 102(e) as being anticipated by Kajiyama *et al.*, (US Patent No.6,428,749, filed on March 16, 2000).

Kajiyama *et al.*, teach advanced thermal gradient DNA chip.

Regrading claims 23 and 29, as shown in Figures 8, 10, and 18, DNA chip 101 that comprised probe cells on a silicon wafer (semiconducting wafer) as recited in claim 29 was connected to a temperature detection terminal (+) 1003 and a temperature detection terminal (-) 1004, which were connected to the controller comprising a power source. Here two temperature

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detection terminals were considered as two connectors that were adjacent to each other as recited in claim 23 (see columns 9, 10, 13-15). A temperature gradient could be generated in the DNA chip (see Figure 3 and lines 42-54 in column 11).

Regarding claims 24 and 25, as shown in Figure 7, SiO<sub>2</sub> membrane and temperature sensor were at the same edge of the DNA chip as recited in claim 24 while temperature sense at least indirectly connected to the controller comprising a temperature controller as recited in claim 24 (see Figure 7, columns 12-15). Although Kajiyama *et al.*, did not directly show to select a set point temperature on the temperature controller, the limitation was considered to be inherent to the reference taught by Kajiyama *et al.*, since the statement that “the temperature of the individual probe cells can be controlled independently according to the method described above refereeing to FIG. 18.” (see Kajiyama *et al.*, column 18) indicated to select a set point temperature.

Regrading claims 30-32, example 3 showed that the process of immobilizing oligonucleotide probes on a manufactured chip to produce a DNA chip. The layer of oligonucleotide probes on the DNA chip were considered as a stratum comprising low thermal conductivity materials as recited in claims 30 and 31 since it was known that oligonucleotide had low thermal conductivity. Alternatively, the layer of oligonucleotide probes on the DNA chip were considered as a stratum comprising a liquid since oligonucleotide solutions were loaded into a manufactured chip to produce a DNA chip (see column 14). The phrase “to generate a temperature gradient on the stratum” was considered as an intended use of the stratum.

Therefore, Kajiyama *et al.*, teach all limitations recited in claims 23-25 and 29-32.

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9. Claims 73, 74, and 76 are rejected under 35 U.S.C. 102(b) as being anticipated by Peterson *et al.*, (Journal of Heat Transfer, 115, 751-756, 1993).

Peterson *et al.*, teach micro heat pipes fabricated in silicon wafers.

Regarding claims 73 and 74, as shown in Figures 2 and 5, micro heat pipe array was fabricated as an integral part of a silicon (two kinds: the rectangular and triangular arrays). At an input power of 4.0 W, the micro heat pipe array were 68 °C and 59.2 °C for rectangular and triangular arrays (heat part of a surface) and a copper heat sink temperature was 15 rectangular and triangular arrays (cool part of a surface). The temperature difference between the micro heat pipe array and the sink created a temperature gradient (see pages 754). A working buffer flowed from the micro heat pipe array to the sink was considered as a stratum having low thermal conductivity (see page 753).

Regrading claim 76, test facility in Figure 5 was considered as a thermoelectric peltier device since it could generate a temperature gradient.

Therefore, select a set point temperature teach all limitations recited in claims 73, 74, and 76.

### ***Conclusion***

10. No claim is allowed.

11. Papers related to this application may be submitted to Group 1600 by facsimile transmission. Papers should be faxed to Group 1600 via the PTO Fax Center located in Crystal Mall 1. The faxing of such papers must conform with the notices published in the Official

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Gazette, 1096 OG 30 (November 15, 1988), 1156 OG 61 (November 16, 1993), and 1157 OG 94 (December 28, 1993)(See 37 CAR § 1.6(d)). The CM Fax Center number is either (703) 308-4242 or (703)305-3014.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Frank Lu, Ph.D., whose telephone number is (703) 305-1270. The examiner can normally be reached on Monday-Friday from 9 A.M. to 5 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, W. Gary Jones, can be reached on (703) 308-1152.

Any inquiry of a general nature or relating to the status of this application should be directed to the patent Analyst of the Art Unit, Ms. Chantae Dessau, whose telephone number is (703) 605-1237.

Frank Lu  
September 30, 2002

  
W. Gary Jones  
Supervisory Patent Examiner  
Technology Center 1600